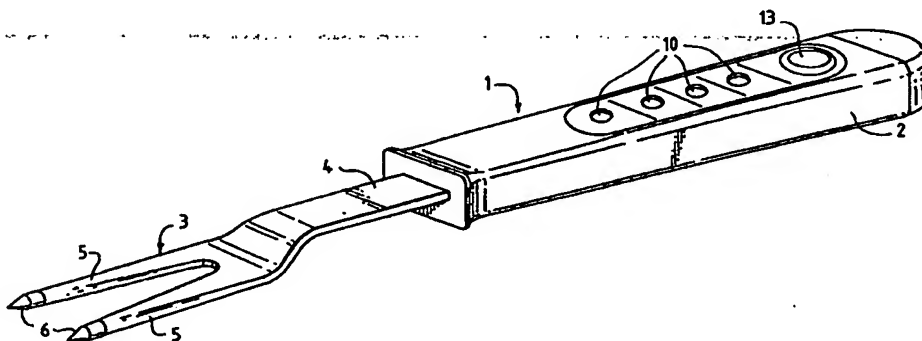




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : G01K 1/14, 7/22	A1	(11) International Publication Number: WO 99/37981 (43) International Publication Date: 29 July 1999 (29.07.99)
(21) International Application Number: PCT/US99/00735 (22) International Filing Date: 13 January 1999 (13.01.99) (30) Priority Data: 09/014,221 27 January 1998 (27.01.98) US (71) Applicant: TRUCOOK, L.L.C. [US/US]; 6600 North Lincoln Avenue, Lincolnwood, IL 60645 (US). (72) Inventor: NORCROSS, Charles, E.; 1500 Elizabeth Avenue, West Palm Beach, FL 33401 (US). (74) Agent: SINGER, Herbert, J.; Silverman, Cass & Singer, Ltd., 27th floor, 105 West Adams Street, Chicago, IL 60603 (US).		(81) Designated States: AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GE, HR, HU, ID, IL, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, UZ, VN, YU, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: INDICATOR DEVICE AND UTENSIL FOR COOKING MEAT



(57) Abstract

A cooking utensil, for example a fork, for measuring and indicating the internal temperature of food. The utensil includes a hollow housing forming a handle (2), fork tines (5) extending from the handle (2) for inserting into food for manipulating it. The tines (5) terminate in a sharp tip (6) to facilitate penetration of the food. Mounted within the tine, toward the tip, is a temperature sensing element such as a thermistor, which varies, that is, by varying its resistance according to temperature. A power source and control circuit are mounted within the handle (2), and a temperature indicator (10) such as a light emitting diode (LED) is mounted on an outer face of the handle. A circuit interconnects the temperature sensor, power source, and LED so that current flow varies with the temperature of the sensor and thereby indicates the temperature within the food at the tip of the fork tine.

INDICATOR DEVICE AND UTENSIL FOR COOKING MEAT

TECHNICAL FIELD

The subject invention relates generally to devices used for indicating the temperature of food when cooking or handling the food, and more specifically to a utensil
5 used for handling and indicating temperature or cooking status of food, particularly meat cooked on a grill, broiler, or in an oven.

BACKGROUND ART

Uniformly obtaining a desired cooked state of meat
10 can be challenging due to various factors which influence cooking time and temperature. For example, the initial temperature of meat, that is, whether it was refrigerated or thawed prior to initiating the cooking process; or the type of heating source for cooking, such as, gas or
15 electric oven or barbecue grill. Various devices have been developed to determine and indicate the temperature on the inside of cooking meat so that a desired level of cooking can be achieved prior to removing the meat from the heat source. Certain of these devices have been the
20 subject of patents, a selected example of which are summarized below.

U.S. Patent No. 3,552,210 discloses a fork utensil comprising a handle with impaling means extending therefrom to be inserted into food, for measuring the
25 internal temperature of food. Mounted at the tip is a temperature sensitive element which varies by varying its resistance according to temperature. The relative temperature of the meat is then registered on a standard mechanical meter.

30 U.S. Patent No. 2,898,845 discloses a combined skewer and thermometer for use in supporting meat as it is revolved in a heat source with interior means for sensing the interior temperature of the meat.

U.S. Patent No. 4,058,013 discloses a meat
35 thermometer for use when broiling meat on a grill or in

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

an oven, having a stem containing a bimetallic element in one end with an indicator within the housing.

U.S. Patent No. 2,154,426 discloses a metallic temperature-indicating thermometer for insertion into meat
5 or any other cooked product during the cooking process, and can be left in during that cooking period to indicate the temperature of cooking.

None of the above patents describe a combination cooking utensil, such as a fork, and meat thermometer
10 which can be used to easily and accurately determine the internal temperature of meat being cooked under conditions where little ambient light is available, for example, grilling outdoors at night. As any backyard chef is aware, visually determining how done grilled meat
15 is can be especially difficult as darkness falls. The ability to determine the degree of doneness of food at night, especially meat such as hamburger or chicken which can harbor pathogenic organisms that pose a serious health risk, is important in preventing such a health
20 risk.

DISCLOSURE OF INVENTION

It is therefore an object of the invention to provide a utensil and method for accurately determining the internal temperature of meat during cooking in conditions
25 of low ambient light.

It is a further object of the invention to provide a combination cooking utensil and meat thermometer which accurately and rapidly indicates the internal temperature of the meat and thereby the degree to which the meat is
30 done.

It is yet another object of the invention to provide a convenient cooking utensil used for outdoor grilling whereby the meat can be consistently cooked to a desired degree or state of doneness.

BRIEF DESCRIPTION OF THE DRAWINGS

35 Figure 1 shows a perspective view of an embodiment of the utensil according to the subject invention, wherein the utensil includes distinct LED displays as temperature

indicators.

Figure 2 shows a perspective view of another embodiment of the handle of the subject device, wherein the handle includes a series of LED "bars" as temperature indicators.

Figure 3 shows a perspective view of yet another embodiment of the handle of the subject device, wherein the handle includes a digital temperature display.

Figure 4 shows a section view of the hollow impaling means having a temperature sensing tip and an electrical conducting means disposed within said impaling means.

Figure 5 shows a schematic illustration of the control circuit used in an embodiment of the subject device.

BEST MODE FOR CARRYING OUT THE INVENTION

The subject invention concerns a combination cooking utensil, such as a fork, and a thermometer for detecting or indicating the temperature and thereby degree of cooking undergone by food. The subject invention comprises a hollow housing forming a handle and an impaling means, such as a fork having tines, extending from said handle. Control means for controlling operation of an electrical temperature sensor and indicating means are included as part of the subject invention and, preferably, are disposed within said handle housing.

Referring to the drawings, illustrated in Fig. 1 is an embodiment of the subject cooking utensil 1 comprising a handle 2 shaped for convenient manual gripping by the user and constructed of a material of low heat conductivity, for example of Bakelite or another plastic which is known and accepted in the art. Extending from the handle 2 is an impaling means 3 to be inserted into the food to enable it to be properly manipulated. In a preferred embodiment, these impaling means are hollow. As illustrated, this impaling means comprises a shank 4 secured at one end to the handle 2 and comprising at its other end tines 5 which terminate in sharp points 6 to

facilitate penetration of the food. One of the tines 5 comprises a temperature sensing element 7, such as a thermistor, (Fig. 4) mounted therewithin near its tip. The temperature sending element 7 can be secured in position, for example by non-toxic potting material, and has electrical conducting means, such as wires 8 and 9 extending through the hollow tine 5. The electrical conducting means also extend through the shank 4 and into the handle 2, for connecting the temperature sensitive element 7 to a control circuit 15 (Fig. 5) for receiving input from the temperature detecting means and controlling temperature indicator means 10. The housing 2 includes a cavity therewithin to receive an electrical energy or power source such as a battery.

In a preferred embodiment, the temperature indicating means for the subject utensil comprises a light emitting diode (LED). The control circuit is designed or programmed such that an LED is activated at a certain temperature or range of temperatures. For example, an LED can be activated at 140°F to signify that meat is at least "rare". A plurality of LEDs can be provided to indicate different temperatures or ranges. For example, Fig. 1 shows a set of four LEDs 10 disposed on a face of the handle 2. This handle can be correspondingly marked with R, M, MW, and W, signifying rare, medium, medium-well, and well done.

It should be understood that other configurations are possible for the LED indicators. For example, a single LED can be activated to indicate a particular temperature or particular range of temperatures. In an embodiment of the utensil comprising a plurality of indicators, a single LED can be activated to indicate a specific temperature, or a combination of more than one LED can be activated to indicate a particular temperature or degree of doneness. For example, the plurality of LEDs can be singly and sequentially activated as temperature increases. Alternatively, activation of particular combinations of LEDs can also be coded to indicate a

particular temperature, range of temperatures, or state of doneness for the food.

Fig. 2 shows an alternative configuration wherein a plurality of LEDs is arranged as a series of light "bars" 11 wherein each light bar can indicate a narrower range of temperatures so that a more accurate or more precise reading of food temperature can be indicated. The LED indicators can be activated alone or in different combinations for indicating temperature or doneness of the food.

Advantageously, these LEDs can be easily seen in conditions of low ambient light such that, for example, inside temperature of a steak, hamburger, or chicken cooked on an outdoor grill at night and be readily determined by the user.

Accurately determining temperature of meat can be important for a number of reasons, including desire to prepare meat as requested by the person who is to eat the meat, as well as for health reasons. Specifically, certain pathogenic microbes can be harbored in meat or other food. These pathogenic organisms can be inactivated by exposing them to a particular minimum temperature for a minimum period of time. Grilling meat at night or in a dark area presents a problem for visually determining the degree of doneness of the meat. The subject invention, comprising LED or lighted digital display for indicating inner temperature of meat, can enable a user to rapidly and accurately determine the temperature inside meat, even in darkness, such that undercooking of the meat and risk of sickness caused by pathogenic organisms present in the meat is prevented.

Fig. 3 shows yet another embodiment of the subject utensil wherein the temperature indicator comprises a digital display 12. Preferably, the digital display is lighted so that the reading can be done in conditions of low ambient light.

Figure 5 shows the temperature sensing element 7, the temperature indicator means 10, and the battery

interconnected by means of a control circuit 15. The circuit is mounted on a circuit board and disposed within the handle housing 2 shown in Figs. 1-3. Circuits suitable for use in the subject utensil are commercially available. For example, such a circuit can be found in a meat probe sold as Model ETI by Maverick Co. of Edison, New Jersey. Other circuits can also be used according to the configuration of the temperature sensing element of temperature indicators.

The subject utensil can include a switch 13, preferably a push button switch, and more preferably conveniently located on handle 2 in a place where it can be easily actuated with the same hand used to grip the handle.

In operation the utensil 1 is manipulated just like an ordinary barbecue fork for supplying meat to the grill, turning it, and removing it. When it is desired to determine if the meat is done to the desired degree, the fork tine is inserted into the meat until temperature sensitive element 7 at the tip of one tine is approximately mid-way through the meat. The switch 13 is closed, and within a very short time, roughly within about three seconds, the temperature indicator displays how well done the food is. If done to the proper degree, the meat can be removed using the fork element of the subject utensil. To facilitate insertion of the temperature sensitive element 7 the proper depth, a stop can be attached to one of the tines.

It should be understood that the examples and embodiments described herein are for illustrative purposes only and that various modifications or changes in light thereof will be suggested to persons skilled in the art and are to be included within the spirit and purview of this application and the scope of the appended claims.

CLAIMS

1. A utensil for measuring and indicating the temperature of food, comprising:

a hollow housing defining a handle;

5 hollow impaling means including a shank extending from the handle for insertion into the food for manipulation thereof, and forming a fork having at least a pair of tines, each of said tines terminating in a sharp tip to facilitate penetration of the food by said
10 tines;

temperature sensing means mounted adjacent a tip of at least one of said tines;

conductive means extending within said hollow impaling means from said temperature sensing means to a
15 control circuit;

a source of electrical power operatively and selectively connecting said control circuit and said temperature sensing means; and

an LED temperature responsive indicator means for
20 illuminating said indicator in response to variations in temperature of said food.

~~2. The utensil according to claim 1 wherein said~~
impaling means are hollow through their entire length and
said conductive means are disposed therein and extend
25 therethrough to said control circuit within said handle.

3. The utensil according to claim 1 wherein said control circuit includes a switch mounted on said handle and adapted to selectively connect said power source to said temperature indicator means and temperature sensing
30 means.

4. The utensil according to claim 1 wherein said temperature sensing means comprises a thermistor.

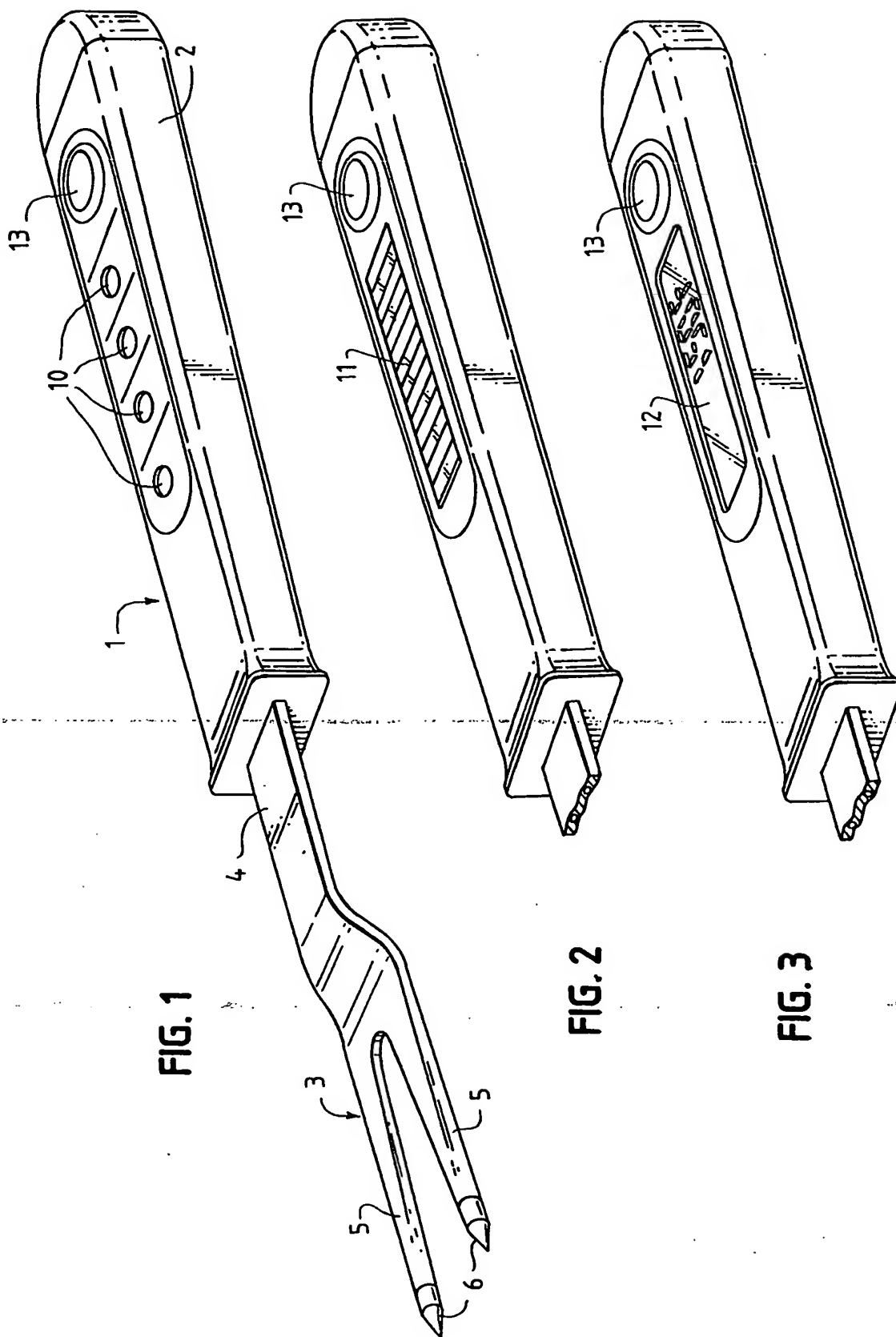
5. The utensil of claim 1 wherein said temperature indicating means includes a plurality of light emitting
35 diodes.

6. The utensil of claim 5 wherein said plurality of light emitting diodes are activated sequentially to indicate different temperatures.

7. The utensil of claim 5 wherein said plurality of light emitting diodes are selectively activated individually or in combination for indicating temperature.

- 5 8. A utensil for measuring and indicating temperature of food, said utensil comprising:
- a combination hollow handle defining a housing;
 - a pair of hollow fork tines extending from said housing and terminating in a sharp tip;
 - 10 a control circuit within said housing;
 - a temperature sensor in said tip and electrically coupled to the control circuit;
 - an electrical conductor coupled to the control circuit;
 - 15 a power source selectively connected to said control circuit; and
 - a lighted temperature indicator responsive to variations in said temperature sensor to reflect the temperature of said food.

1/2



2/2

FIG. 4

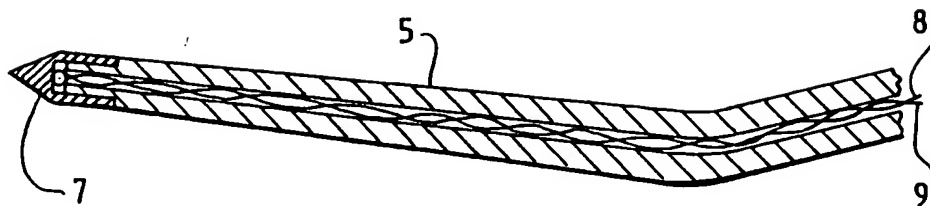
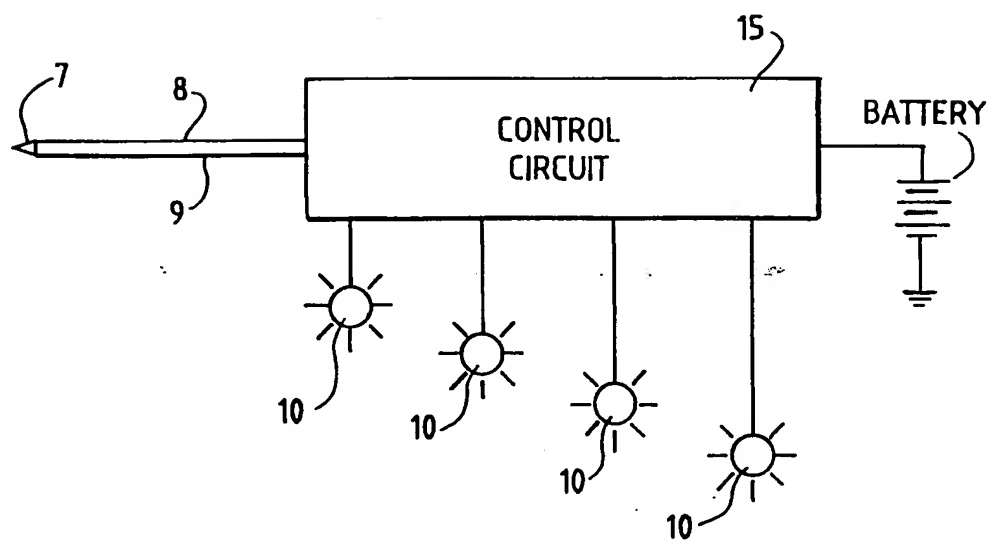


FIG. 5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/00735

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G01K 1/14, 7/22

US CL : 374/141, 155, 185; 99/342; D10/46.2

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 374/141, 155, 185; 99/342; D10/46.2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,552,210 A [R.C. Wright, Jr] 17 April 1969 (17-04-69). See entire reference.	1-8
Y	US 5,820,263 A [Ciobanu] 13 Oct 1998 (13-10-98). See entire reference.	1-8
A	US 5,678,925 A [Garmaise et al.] 21 Oct 1997 (21-10-97).	1, 5-8
A	US 5,620,255 A [Cook, III] 15 Apr 1997 (15-04-97).	8.
A	US 5,018,875 A [Cook] 28 May 1991 (28-05-91).	1-3, 5-8.
A	US 4,813,790 A [Frankel et al.] 21 Mar 1989 (21-03-89).	1-8.

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	T	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 26 FEBRUARY 1999	Date of mailing of the international search report 17 MAR 1999
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer DIEGO GUTIERREZ Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/00735

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US Des 228,337 A [Maynard et al.] 11 Sept 1973 (11-09-73).	1, 8.
A	US 4,580,909 A [McIntosh] 08 Apr 1986 (08-04-86).	2, 3.
A	Delta Airlines, Delta's World of Gifts Magazine. Summer 1993.	1-8